IN THE CLAIMS

Claims 1 - 212 (cancelled)

213. (New) A method for analysis of a sample comprising:

configuring a transmitter to emit chosen electromagnetic radiation;

transmitting electromagnetic radiation being emitted by said transmitter through a first structure comprising a substantially transparent substrate carrying a plurality of spaced-apart metallic islands; receiving a transmission of said electromagnetic radiation by a detector, and generating a first measurement indicative of the received transmission, said first measurement being representative of a surface plasmon absorption of said plurality of metallic islands in the transmitted first structure;

adsorbing a chemical substance from the sample onto said first structure so as to produce a second structure substantially transmitting with respect to said electromagnetic radiation, said second structure comprising said substrate and a moiety, wherein this sampling moiety includes the sampled chemical substance and said plurality of metallic islands, said second structure thereby having a second different plasmon absorption characteristic;

transmitting electromagnetic radiation being emitted by said transmitter through said second structure, receiving a transmission of said electromagnetic radiation by a detector, and generating a second measurement indicative of the received transmission, the second measurement being representative of the second surface plasmon absorption of said plurality of metallic islands in the transmitted second structure; and

comparing said first and second measurement representative of the

surface plasmon absorption of the first and second structures, respectively, said comparing identifying plasmon absorption, said identifying allowing generation, based on the identified plasmon absorption, of at least one of a quantitative indication and a qualitative indication of at least one of the following: the sampling moiety, a functionality of the sampling moiety, said plurality of metallic islands, a functionality of said plurality of metallic islands, the sampled chemical substance, and a functionality of the sampled chemical substance.

214. (New) A method according to claim 213, wherein said first structure, comprising said substrate with said plurality of metallic islands, carries a moiety including a chemical substance and said plurality of metallic islands, this chemical substance being selected to adsorb thereon the chemical substance for sampling, the moiety thereby serving as adsorbing moiety for the sampled chemical substance, this adsorbing moiety including the adsorbing chemical substance and said plurality of metallic islands, this adsorbing moiety thereby capable of forming the sampling moiety upon the adsorbance of the sampled chemical substance thereon, said sampling moiety thereby comprising, upon its formation, said plurality of metallic islands, said sampled chemical substance, and the adsorbing chemical substance.

215. (New) A method according to claim 214, wherein said first structure consists essentially of said substrate, carrying said adsorbing moiety, and said adsorbing moiety.

216. (New) A method according to claim 214, wherein said first structure comprises an intermediate layer, carrying said adsorbing moiety and being carried by said substrate.

217. (New) A method according to claim 215, comprising producing said first structure by adsorbing the adsorbing chemical substance onto the plurality of metallic islands.

218. (New) A method according to claim 216, comprising producing said first structure by adsorbing the adsorbing chemical substance onto the plurality of metallic islands.

219. (New) A method according to claim 214, wherein the transmitting electromagnetic radiation is emitted by a laser.

220. (New) A method according to claim 214, wherein the transmitting electromagnetic radiation is transmitted through a filter monochromator being upstream the transmitted structure.

221. (New) A method according to claim 220, wherein said monochromator is between said transmitter and said sample.

222. (New) A method according to claim 214, wherein said detector is a spectrophotometer.

223. (New) A method according to claim 214, wherein said transmitter performs spectral scanning.

224. (New) A method according to claim 214, comprising performing a baseline correction procedure for said transmitter.

225. (New) A method according to claim 214, comprising performing said measurements in a baseline correction mode of said transmitter.

226. (New) A method according to claim 214, comprising using a reference beam for said electromagnetic radiation.

227. (New) A method according to claim 214, comprising recording a baseline of said transmitter.

228. (New) A method according to claim 214, wherein said transmitter comprises a light source being externally placed with respect to the structure, said light source emitting said electromagnetic radiation.

229. (New) A method according to claim 214, wherein the electromagnetic radiation transmitted through said second structure is further transmitted through the sample.

230. (New) A method according to claim 213, wherein said first structure consists essentially of said substrate carrying said plurality of spaced-apart metallic islands.

231. (New) A method according to claim 214, and wherein said adsorbing said sampled chemical substance comprises producing at least one of the following interactions between the sampled chemical substance and the adsorbing substance: a hydrogen bond, an ionic bond, a covalent bond, a Van der Waals force, an electrostatic force, and a physical force.

232. (New) A method according to claim 214, wherein said emitted electromagnetic radiation comprises electromagnetic radiation in the ultraviolet/visible/ infra-red range.

233. (New) A method according to claim 214, wherein said emitted electromagnetic radiation comprises electromagnetic radiation in the range of 300-1100 nm.

234. (New) A method according to claim 214, wherein said emitted electromagnetic radiation is in the ultraviolet/visible/infra-red range.

235. (New) A method according to claim 214, and wherein said emitted electromagnetic radiation is in the range of 300-1100 nm.

236. (New) A method according to claim 214, and wherein said comparing comprises determining a change in a surface plasmon absorbance of said plurality of metallic islands between said first and second measurements.

237. (New) A method according to claim 214, and wherein each of said first and second measurements comprises a peak of maximal absorbance.

238. (New) A method according to claim 214, and wherein said comparing said first and second measurements comprises determining a change in plasmon absorbance of said electromagnetic radiation at a specific wavelength.

239. (New) A method according to claim 214, and wherein each of said first and second measurements comprises a real-time measurement.

240. (New) A method according to claim 214, and wherein each of said first and second measurements comprises a continuous measurement.

241. (New) A method according to claim 214, and wherein each of said first and second measurements comprises a kinetic monitoring.

242. (New) A method according to claim 214, comprising producing said plurality of metallic islands on said substrate.

243. (New) A method according to claim 217, comprising annealing said plurality of metallic islands carried by said substrate prior to said adsorbing said adsorbing chemical substance onto said plurality of metallic islands.

244. (New) A method according to claim 214, comprising annealing said plurality of metallic islands on said transparent substrate, said annealing comprising heating said plurality of metallic islands on said transparent substrate for up to 24 hours at up to 400°C.

245. (New) A method according to claim 214, comprising annealing said plurality of metallic islands on said transparent substrate, said annealing comprising heating said plurality of metallic islands on said transparent substrate for up to 4 hours at up to 350°C.

246. (New) A method according to claim 216, and wherein each of said first and second measurements comprises a peak of maximal absorbance.

247. (New) A method according to claim 216, and wherein said comparing said first and second measurements comprises determining a change in an absorbance of said sampling moiety at a specific wavelength.

248. (New) A method according to claim 213, wherein said first structure comprises an intermediate layer carrying said plurality of spaced-apart metallic islands and carried by said substantially transparent substrate.

249. (New) A method according to claim 248, and wherein each of said first and second measurements comprises performing a real-time measurement.

250. (New) A method according to claim 216, and wherein each of said first and second measurement comprises a continuous measurement.

251. (New) A method according to claim 216, and wherein each of said generating a first measurement and said generating a second measurement comprises performing kinetic monitoring.

252. (New) A method according to claim 216, comprising producing the plurality of metallic islands on the intermediate layer on the transparent substrate.

253. (New) A method according to claim 252, and wherein said producing said plurality of metallic islands includes producing said plurality of metallic islands from at least one of the following: gold, silver, copper, titanium, vanadium, chromium, steel, at least one ultra-thin layer of a metal, a binary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium; or a ternary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium.

254. (New) A method according to claim 252, and wherein said producing said plurality of metallic islands comprises evaporating metal and depositing it on said intermediate layer.

255. (New) A method according to claim 252, and wherein said producing said plurality of metallic islands comprises sputtering metal and depositing it on said intermediate layer.

256. (New) A method according to claim 252, and wherein said producing said plurality of metallic islands comprises electroless deposition of metal onto said intermediate layer.

257. (New) A method according to claim 252, and wherein said producing said plurality of metallic islands comprises electrolytic deposition of metal onto said intermediate layer.

258. (New) A method according to claim 252, and wherein said producing said

plurality of metallic islands comprises hot-melt deposition of metal onto said intermediate layer.

259. (New) A method according to claim 216, comprising annealing said plurality of metallic islands on said intermediate layer on said transparent substrate.

260. (New) A method according to claim 218, comprising annealing said plurality of metallic islands performed prior to said producing the adsorbing moiety, said producing thereby performed by adsorbing the adsorbing chemical substance onto the annealed plurality of metallic islands.

261. (New) A method according to claim 259, and wherein said annealing comprises heating said plurality of metallic islands on said intermediate layer on said transparent substrate for up to 24 hours at up to 400°C.

262. (New) A method according to claim 260, and wherein said annealing comprises heating said plurality of metallic islands on said intermediate layer on said transparent substrate for up to 4 hours at up to 350°C.

263. (New) An apparatus for analysis of an at least one predetermined chemical substance received from a sample, comprising:

a transmitter configured to emit chosen electromagnetic radiation;

a first structure comprising a substantially transparent substrate carrying a plurality of spaced-apart metallic islands on said substrate, said first structure

thereby having a first characteristic of a surface plasmon absorption with respect to said electromagnetic radiation , and wherein said first structure is capable of adsorbing thereon the at least one predetermined chemical substance thereby forming a second structure comprising said substrate carrying a moiety including said plurality of spaced-apart metallic islands and the sampled chemical substance, said second structure thereby having a second different characteristic of a surface plasmon absorption with respect to said electromagnetic radiation;

a detector configured to receive said electromagnetic radiation being emitted by said transmitter and transmitted through the structure, and to generate a measurement of the received radiation, a processor operative to receive a first and a second measurement from the detector, to identify plasmon absorption, so as to allow generation, based on the identified plasmon absorption, at least one of a quantitative indication and a qualitative indication of at least one of: said chemical substance-metallic islands moiety, a functionality of said chemical substance-metallic islands moiety, said plurality of metallic islands, a functionality of said plurality of metallic islands, said chemical substance and a functionality of said chemical substance.

264. (New) An apparatus of claim 263, wherein said transmitter comprises a laser, said laser emitting said electromagnetic radiation.

265. (New) An apparatus of claim 263, wherein said transmitter comprises a light source placed upstream of a filter monochromator which is placed upstream of the structure, said light source emitting said emitted electromagnetic radiation.

266. (New) An apparatus of claim 263, wherein said transmitter comprises a

wavelength scanning generator of electromagnetic radiation, said generator being placed upstream of the structure and upstream of the sample.

267. (New) An apparatus of claim 263, wherein said transmitter comprises a light source being externally placed with respect to the structure, said light source emitting said emitted electromagnetic radiation.

268. (New) An apparatus of claim 263, wherein said transmitter comprises a directional light source, said light source emitting said emitted electromagnetic radiation.

269. (New) An apparatus of claim 263, wherein said first structure comprises an intermediate layer carried by said substrate and carrying said plurality of metallic islands.

270. (New) An apparatus according to claim 263, and wherein said substrate comprises at least one of the following: glass, plastic, polystyrene, a polymeric material, an inorganic oxide, quartz and mica.

271. (New) An apparatus according to claim 263, and wherein said substrate has a thickness of up to 5 mm.

272. (New) An apparatus according to claim 263, and wherein said plurality of metallic islands includes metallic islands comprising at least one of the following: gold, silver, copper, titanium, vanadium, chromium, steel, at least one ultra-thin layer of a metal, a binary alloy of the following elements: gold, silver, copper, titanium, vanadium, and

chromium; or a ternary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium.

273. (New) An apparatus according to claim 263, and wherein said metallic islands are gold islands.

274. (New) An apparatus according to claim 263, and wherein said plurality of metallic islands includes metallic islands having a thickness of up to 400 Ångstrom units.

275. (New) An apparatus according to claim 274, wherein the thickness is between 10 to 100 Ångstrom units.

276. (New) An apparatus according to claim 269, and wherein said plurality of metallic islands includes metallic islands from at least one of the following: gold, silver, copper, titanium, vanadium, chromium, steel, at least one ultra-thin layer of a metal, a binary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium; or a ternary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium.

277. (New) An apparatus according to claim 276, and wherein said plurality of metallic islands comprises metallic islands evaporated onto said substrate.

278. (New) An apparatus according to claim 276, and wherein said plurality of metallic islands comprises metallic islands sputtered on said substrate.

279. (New) An apparatus according to claim 276, and wherein said plurality of metallic islands comprises metallic islands produced by electroless deposition of metal on said substrate.

280. (New) An apparatus according to claim 276, wherein said plurality of metallic islands comprises metallic islands produced electrolytic deposition of metal on said substrate.

281. (New) An apparatus according to claim 276, and wherein said plurality of metallic islands comprises hot-melt deposition of metallic islands produced by hot-melt deposition of metal on said substrate.

282. (New) An apparatus according to claim 263, comprising said plurality of metallic islands annealed on said substrate.

283. (New) An apparatus according to claim 269, and wherein said intermediate layer comprises at least one metal oxide.

284. (New) An apparatus according to claim 269, and wherein said at least one metallic oxide comprises at least one of the following: chromium oxide, titanium oxide, nickel oxide, lead oxide, and tin oxide.

285. (New) An apparatus according to claim 269, and wherein said intermediate layer comprises a metal.

286. (New) An apparatus according to claim 269, and wherein said intermediate layer comprises at least one of a nitrogen containing moiety, a sulfur containing moiety, and an inorganic hydrogen-containing moiety.

287. (New) An apparatus according to claim 269, and wherein said intermediate layer comprises at least one of the following chemical groups: sulfhydryl, thiocyanate, thiol, sulfide, disulfide, and amine.

288. (New) An apparatus according to claim 269, and wherein said intermediate layer comprises an organic layer.

289. (New) An apparatus according to claim 263, and wherein the sample chemical substance and said plurality of metallic islands is bonded by at least one of the following interactions in the sampling moiety: a hydrogen bond, an ionic bond, a covalent bond, a Van der Waals force, an electrostatic force, and a physical force.

290. (New) An apparatus according to claim 263, wherein the emitted electromagnetic radiation comprises electromagnetic radiation in the ultraviolet/visible/infra-red range.

291. (New) An apparatus according to claim 263, and wherein the emitted electromagnetic radiation comprises electromagnetic radiation in the range of 300-1100 nm.

292. (New) An apparatus according to claim 263, and wherein the emitted

electromagnetic radiation is in the ultraviolet/visible/infra-red range.

293. (New) An apparatus according to claim 263, and wherein the emitted electromagnetic radiation is in the range of 300-1100 nm.

294. (New) An apparatus of claim 263, wherein said first structure comprises said substrate carrying a moiety including a chemical substance and said plurality of spaced-apart metallic islands, said chemical substance is selected to adsorb thereon said at least one chemical substance to form a sampled chemical substance-adsorbing chemical substance-metallic islands moiety on said substrate, thereby enabling formation of the second structure comprising said substrate carrying the sampling moiety and having the second different surface plasmon absorption characteristic and second different transmission profile as compared to that of the first structure

295. (New) Apparatus according to claim 294, and wherein said electromagnetic radiation comprises electromagnetic radiation in the ultraviolet/visible/infra-red range.

296. (New) Apparatus according to claim 294, and wherein said electromagnetic radiation comprises electromagnetic radiation in the range of 300-1100 nm.

297. (New) Apparatus according to claim 294, and wherein said transparent substrate includes at least one of the following: glass, plastic, polystyrene, a polymeric material, an inorganic oxide, quartz and mica.

298. (New) Apparatus according to claim 294, and wherein said transparent substrate has a thickness of up to 5 mm.

299. (New) Apparatus according to claim 294, and wherein said plurality of metallic islands includes at least one of the following: gold, silver, copper, titanium, vanadium, chromium, steel, at least one ultra-thin layer of a metal, a binary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium; or a ternary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium.

300. (New) Apparatus according to claim 294, and wherein said metallic islands are gold islands.

301. (New) Apparatus according to claim 294, and wherein said metallic islands have a thickness of up to 400 Ångstrom units.

302. (New) Apparatus according to claim 301, and wherein the thickness is between 10 to 100 Ångstrom units.

303. (New) Apparatus according to claim 263, and wherein said processor is operative to perform comparing of said first and second measurements comprising a peak of maximal absorbance to determine a change in the absorbance at said peak.

304. (New) Apparatus according to claim 263, and wherein said processor is operative to perform comparing of said first and second measurements comprising an

absorbance of said sampling moiety at a specific wavelength to determine a change in the absorbance at said specific wavelength.

305. (New) Apparatus according to claim 294, and wherein said detector is further operative to perform real-time measurements.

306. (New) Apparatus according to claim 294, and wherein said detector is further configured to perform continuous measurements.

307. (New) Apparatus according to claim 294, and wherein said detector is further configured to perform kinetic monitoring.

308. (New) Apparatus according to claim 295, wherein said plurality of metallic islands on the transparent substrate is produced by a metal deposition.

309. (New) Apparatus according to claim 308, wherein said metal deposition comprises a deposition from at least one of the following: gold, silver, copper, titanium, vanadium, chromium, steel, at least one ultra-thin layer of a metal, a binary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium; or a ternary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium.

310. (New) Apparatus according to claim 308, wherein said metal deposition comprises evaporation of metal.

311. (New) Apparatus according to claim 308, wherein said metal deposition comprises sputtering of metal.

312. (New) Apparatus according to claim 308, wherein said metal deposition comprises an electroless deposition of metal.

313. (New) Apparatus according to claim 308, wherein said metal deposition comprises an electrolytic deposition of metal.

314. (New) Apparatus according to claim 308, and wherein said metal deposition comprises a hot-melt deposition of metal.

315. (New) Apparatus according to claim 308, wherein said plurality of metallic islands on said transparent substrate is annealed.

316. (New) Apparatus according to claim 308, wherein said plurality of metallic islands is annealed for up to 24 hours at up to 400°C.

317. (New) Apparatus according to claim 316, wherein said plurality of metallic islands is annealed for up to 4 hours at up to 350°C.

318. (New) Apparatus according to claim 294, wherein said first structure comprises an intermediate layer between said transparent substrate and said metallic islands.

319. (New) Apparatus according to claim 318, and wherein said intermediate layer comprises at least one metal oxide.

320. (New) Apparatus according to claim 318, and wherein said at least one metallic oxide comprises at least one of the following: chromium oxide, titanium oxide, nickel oxide, lead oxide and tin oxide.

321. (New) Apparatus according to claim 320, and wherein said intermediate layer comprises a metal.

322. (New) Apparatus according to claim 318, and wherein said intermediate layer comprises at least one of a nitrogen containing moiety, a sulfur containing moiety and an inorganic hydrogen-containing moiety.

323. (New) Apparatus according to claim 327, and wherein said intermediate layer comprises at least one of the following chemical groups: sulfhydryl, thiocyanate, thiol, sulfide, disulfide and amine.

324. (New) Apparatus according to claim 318, and wherein said intermediate layer comprises an organic layer.

325. (New) An apparatus according to claim 318, and wherein said transparent substrate comprises at least one of the following: glass, plastic, polystyrene, a polymeric material, an inorganic oxide, quartz and mica.

326. (New) An apparatus according to claim 318, and wherein said transparent substrate has a thickness of up to 5 mm.

327. (New) An apparatus according to claim 318, and wherein said plurality of metallic islands includes metallic islands comprising at least one of the following: gold, silver, copper, titanium, vanadium, chromium, steel, at least one ultra-thin layer of a metal, a binary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium; or a ternary alloy of the following elements: gold, silver, copper, titanium, vanadium, and chromium.

328. (New) An apparatus according to claim 318, and wherein said metallic islands are gold islands.

329. (New) An apparatus according to claim 318, and wherein said plurality of metallic islands includes metallic islands having a thickness of up to 400 Ångstrom units.

330. (New) An apparatus according to claim 329, wherein the thickness is between 10 to 100 Ångstrom units.